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EXAMINER

DARE, RYAN A

ART UNIT PAPER NUMBER

2186

DATE MAILED: 04/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/631,988	MARLAN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ryan Dare	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 2/2/06.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Drawings***

1. The amendments to the specification filed on 2/2/2006 are approved, and the corresponding objections to the drawings are approved

### ***Claim Rejections - 35 USC § 101***

2. The amendments to the claims filed on 2/2/2006 overcome the rejection under 35 U.S.C. 101. The examiner believes that the term "computer storage medium" is sufficient to only cover statutory mediums and excludes electrical, optical, acoustical and other propagated signals encompassed by the broader term, "machine-readable medium."

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-3, 5-6, 12-21, and 27-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes et al., US Patent 6427193 and Pitts et al., US Patent 4893248.
6. With respect to claim 1, Hughes et al. teach an apparatus comprising:
- a load/store unit that includes a retry logic that is to retry access to a resource after receipt of a negative acknowledgement for an attempt to access the resource by the load/store unit, in col. 39, lines 20-32.
- Hughes et al. fail to disclose the congestion detection logic of claim 1. Pitts et al. disclose a congestion detection logic to output a signal that indicates that the resource is congested based on receipt of a consecutive number of negative acknowledgements in response to access requests to the resource, in col. 21, lines 24-40. In this particular embodiment, the number of consecutive negative acknowledgements that indicates congestion is three.
7. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Pitts et al. before him at the time the invention was made to combine the resource access apparatus of Hughes et al. with the resource access apparatus of Pitts et al. in order to eliminate deadlock problems and allow multiple processors to complete their memory operations as taught by Hughes et al. in the last three lines of the abstract.

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8. With respect to claim 2, Pitts et al. teach the apparatus of claim 1 further comprising a congestion control logic to disable the retry logic from retry accesses to the resource based on receipt of the signal from the congestion detection logic, in col. 21, lines 27-31.

9. With respect to claim 3, Pitts et al. teach to wait an amount of time while the resource is congested as discussed supra, but fails to teach an exponential delay. Hughes et al. teach an exponential delay in the abstract, where it says "the processor is configured to increase the backoff time at an exponential rate." The backoff time refers to the time before retrying to access the resource.

10. With respect to claim 5, Hughes et al. teach a processor comprising:

a functional unit to attempt to access data from memory coupled to the processor based on an access request, in figure 1 and col. 10, lines 1-2, wherein the functional unit is to retry attempts to access of the data based on other access of the data based on other access requests after receipt of a negative acknowledgement in response to the attempt to access the data, in col. 39, lines 20-32.

Pitts et al. teach a congestion detection logic to detect congestion of access of the data based on receipt of a consecutive number of negative acknowledgments that exceed a threshold prior to access of the data, in col. 21, lines 24-40; and

Hughes et al. teach a congestion control logic to disable the functional unit from attempts to access the data for a time period after the congestion is detected in col. 39, lines 6-23.

11. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Pitts et al. before him at the time the invention was made to combine the resource access system of Hughes et al. with the resource access system of Pitts et al. in order to eliminate deadlock problems and allow multiple processors to complete their memory operations as taught by Hughes et al. in the last three lines of the abstract.

12. With respect to claim 6, Hughes et al. teach the processor of claim 5, wherein the congestion control logic is to exponentially increase the time period after the congestion detection logic is to detect congestion while access to the other data in the memory is congested, in the abstract, where it says "the processor is configured to increase the backoff time at an exponential rate." The backoff time refers to the time before retrying to access the resource.

13. With respect to claim 12, Hughes et al. teach a system comprising:  
a cache memory to store data, in fig. 25, L2 Cache 228; and  
a first processor to attempt to access the data from the cache memory based on access requests, in fig. 25, Processor 10.

Hughes et al. fail to disclose the congestion detection logic of claim 12. Pitts et al. disclose a congestion detection logic to output a signal that indicates that the resource is congested based on receipt of a consecutive number of negative acknowledgements in response to access requests, in col. 21, lines 24-40. In this particular embodiment, the number of consecutive negative acknowledgements that indicates congestion is three.

14. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Pitts et al. before him at the time the invention was made to combine the resource access system of Hughes et al. with the resource access system of Pitts et al. in order to eliminate deadlock problems and allow multiple processors to complete their memory operations as taught by Hughes et al. in the last three lines of the abstract.

15. With respect to claim 13, Hughes et al. teach the system of claim 12 further comprising:

a second processor associated with the cache memory, in fig. 25, Processor 10a;  
a hub controller to receive the access requests from the first processor, the hub controller to forward the access requests to the second processor, wherein the second processor is to determine whether the data in the cache memory is accessible, in fig. 25, Bus Bridge 202. The bus bridge acts as a hub controller in col. 43, lines 15-25.

16. With respect to claim 14, Hughes et al. teaches the system of claim 13, wherein the second processor is to transmit a negative acknowledgement back to the first processor through the hub controller if the data is not accessible, the second processor to transmit a positive acknowledgment back to the first processor through the hub controller if data is accessible, in col. 43, lines 15-25. Note that all requests are channeled through the bus bridge. Pitts et al. teach sending a positive acknowledgement or a negative acknowledgement in col. 21, lines 15-23.

17. With respect to claim 15, Hughes et al. teach the system of claim 12, wherein the first processor further comprises a congestion control logic to disable the first processor

from transmitting the access requests if the congestion detection logic determines that access to the data is congested, in col. 39, lines 20-32.

18. With respect to claim 16, Hughes et al. teach the system of claim 12, wherein the congestion control logic is to disable the first processor from transmitting the access requests for a time period, wherein the time period is based on an exponential back off delay operation, in the abstract.

19. With respect to claim 17, Hughes et al. teach a system comprising:  
a resource, in fig. 25, L2 Cache 228; and  
a first processor having a load/store function unit, the load/store functional unit to attempt to access the resource based on access requests, in fig. 25, Processor 10 and fig. 2, Load/Store Unit 26.

Hughes et al. fail to disclose the congestion detection logic of claim 17. Pitts et al. disclose a congestion detection logic to detect congestion of access of the resource based on a consecutive number of negative acknowledgements received in response to the access requests prior to receipt of a positive acknowledgement in response to one of the access requests within a first time period, in col. 21, lines 24-40. In this particular embodiment, the number of consecutive negative acknowledgements that indicates congestion is three.

20. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Pitts et al. before him at the time the invention was made to combine the resource access system of Hughes et al. with the resource access system of Pitts et al. in order to eliminate deadlock problems and allow multiple



processors to complete their memory operations as taught by Hughes et al. in the last three lines of the abstract.

21. With respect to claim 18, Hughes et al. teach the system of claim 17, further comprising:

a second processor associated with the resource, in fig. 25, Processor 10a;  
a hub controller to receive the access requests from the first processor, the hub controller to forward the access requests to the second processor, wherein the second processor is to determine whether the resource is accessible, in fig. 25, Bus Bridge 202. The bus bridge acts as a hub controller in col. 43, lines 15-25.

22. With respect to claim 19, Hughes et al. teaches the system of claim 18, wherein the second processor is to transmit a negative acknowledgement back to the first processor through the hub controller if the resource is not accessible, the second processor to transmit a positive acknowledgment back to the first processor through the hub controller if resource is accessible, in col. 43, lines 15-25, particularly the embodiment where the cache control logic is in the bus bridge, and controls the external cache. Pitts et al. teach sending a positive acknowledgement or a negative acknowledgement in col. 21, lines 15-23.

23. With respect to claim 20, Hughes et al. teach the system of claim 17, wherein the first processor further comprises a congestion control logic to disable the load/store functional unit from attempting to access the resource if the congestion detection logic is to detect congestion of access of the resource, in col. 29, lines 20-32

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24. With respect to claim 21, Hughes et al. teach the system of claim 17, wherein the congestion control logic is to disable the load/store unit from attempts to access the resource for a second time period, wherein the second time period is based on an exponential back off delay, in the abstract.

25. With respect to claim 27, Hughes et al. teach a method comprising:

transmitting access requests, by a first processor, to access data in a memory, in col. 39, lines 6-9;

Pitts et al. teaches receiving a positive acknowledgement or a negative acknowledgment, in col. 21, lines 15-23; and

detecting congestion of the data based on receipt, by the first processor, of a consecutive number of negative acknowledgements that exceed a first threshold, prior to receipt, by the first processor, of a positive acknowledgment, in col. 21, lines 24-40.

Pitts fails to teach a first processor and a second processor. However, applying the method of Pitts to the multiprocessor system if Hughes teaches all limitations of claim 27.

26. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Pitts et al. before him at the time the invention was made to combine the resource access method of Hughes et al. with the resource access method of Pitts et al. in order to eliminate deadlock problems and allow multiple processors to complete their memory operations as taught by Hughes et al. in the last three lines of the abstract.

27. With respect to claim 28, Hughes et al. teaches controlling access to the data in the memory in col. 39, lines 20-32, but fails to teach that it is due to a consecutive number of negative acknowledgements, received by the first processor, exceeds the first threshold, prior to receipt of the positive acknowledgement. Pitts et al. teaches receiving a consecutive number of negative acknowledgements, prior to receiving a positive acknowledgement in col. 21, lines 24-40.

28. With respect to claim 29, Hughes et al. teaches the method of claim 28, wherein controlling access to the data in the memory comprises disabling transmitting of the access requests, by the first processor, for a time period, in col. 39, lines 20-32.

29. With respect to claim 30, Hughes et al. teaches the method of claim 29, wherein controlling access to the resource comprises exponentially increasing the time period upon determining that the congestion is detected for other data in the memory while the time period has not expired, in col. 39, lines 20-32

30. With respect to claim 31, Hughes et al. teaches a method comprising:  
accessing, by at least one processor, a resource based on an access request, in col. 39, lines 26-69;

Pitts et al. teach receiving a positive acknowledgement or a negative acknowledgement in col. 21, lines 15-23

Hughes et al. teach retrying accessing, by the at least one processor, of the resource based on a number of access requests in col. 39, lines 20-32.

Pitts et al. teach detecting that a consecutive number of negative acknowledgements exceeds a first threshold within a time period, prior to receiving a positive acknowledgments, in col. 21, lines 24-40

31. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Pitts et al. before him at the time the invention was made to combine the resource access method of Hughes et al. with the resource access method of Pitts et al. in order to eliminate deadlock problems and allow multiple processors to complete their memory operations as taught by Hughes et al. in the last three lines of the abstract.

32. With respect to claim 32, Hughes et al. teaches controlling access to the resource by the at least one processor, in col. 39, lines 20-32, but fails to teach that the controlling of access has to do with the receipt of a consecutive number of negative acknowledgments. Pitts et al. teaches the congestion detection logic based upon the consecutive number of negative acknowledgements, exceeds the first threshold, prior to receipt of the positive acknowledgement, in col. 21, lines 24-40.

33. With respect to claim 33, Hughes et al. teach the method of claim 31, wherein controlling access to the resource comprises disabling transmitting of the access requests, by the first processor, for a time period, in col. 29, lines 20-32.

34. With respect to claim 34, Hughes et al. teach a computer storage medium that provides instructions, which when executed by a machine, cause said machine to perform operations, in fig. 25, main memory 204 and col. 43, lines 26-28. Pitts et al. teach a machine-readable medium that provides instructions, which when executed by

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a machine, cause said machine to perform operations, in fig. 1, ROM 34 and col. 9, lines 14-16. The instructions stored in the machine-readable mediums of Hughes et al. and Pitts et al., respectively, perform the following operations:

transmitting access requests, by a first processor, to access data in a memory, in col. 39, lines 6-9;

Pitts et al. teaches receiving a positive acknowledgement or a negative acknowledgment, in col. 21, lines 15-23; and

detecting congestion of the data based on receipt, by the first processor, of a consecutive number of negative acknowledgements that exceed a first threshold, prior to receipt, by the first processor, of a positive acknowledgment, in col. 21, lines 24-40.

Pitts fails to teach a first processor and a second processor. However, applying the method of Pitts to the multiprocessor system if Hughes teaches all limitations of claim 34.

35. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Pitts et al. before him at the time the invention was made to combine the resource access method of Hughes et al. with the resource access method of Pitts et al. in order to eliminate deadlock problems and allow multiple processors to complete their memory operations as taught by Hughes et al. in the last three lines of the abstract.

36. With respect to claim 35, Hughes et al. teaches controlling access to the data in the memory in col. 39, lines 20-32, but fails to teach that it is due to a consecutive number of negative acknowledgements, received by the first processor, exceeds the

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first threshold, prior to receipt of the positive acknowledgement. Pitts et al. teaches receiving a consecutive number of negative acknowledgements, prior to receiving a positive acknowledgement in col. 21, lines 24-40.

37. With respect to claim 36, Hughes et al. teaches the computer storage medium of claim 35, wherein controlling access to the data in the memory comprises disabling transmitting of the access requests, by the first processor, for a time period, in col. 39, lines 20-32.

38. With respect to claim 37, Hughes et al. teaches the computer storage medium of claim 36, wherein controlling access to the resource comprises exponentially increasing the time period upon determining that the congestion is detected for other data in the memory while the time period has not expired, in col. 39, lines 20-32

39. With respect to claim 38, Hughes et al. teach a computer storage medium that provides instructions, which when executed by a machine, cause said machine to perform operations, in fig. 25, main memory 204 and col. 43, lines 26-28. Pitts et al. teach a machine-readable medium that provides instructions, which when executed by a machine, cause said machine to perform operations, in fig. 1, ROM 34 and col. 9, lines 14-16. The instructions stored in the machine-readable mediums of Hughes et al. and Pitts et al., respectively, perform the following operations:

accessing, by at least one processor, a resource based on an access request, in col. 39, lines 26-69;

Pitts et al. teach receiving a positive acknowledgement or a negative acknowledgement in col. 21, lines 15-23

Hughes et al. teach retrying accessing, by the at least one processor, of the resource based on a number of access requests in col. 39, lines 20-32.

Pitts et al. teach detecting that a consecutive number of negative acknowledgements exceeds a first threshold within a time period, prior to receiving a positive acknowledgments, in col. 21, lines 24-40

40. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Pitts et al. before him at the time the invention was made to combine the resource access method of Hughes et al. with the resource access method of Pitts et al. in order to eliminate deadlock problems and allow multiple processors to complete their memory operations as taught by Hughes et al. in the last three lines of the abstract.

41. With respect to claim 39, Hughes et al. teaches controlling access to the resource by the at least one processor, in col. 39, lines 20-32, but fails to teach that the controlling of access has to do with the receipt of a consecutive number of negative acknowledgments. Pitts et al. teaches the congestion detection logic based upon the consecutive number of negative acknowledgements, exceeds the first threshold, prior to receipt of the positive acknowledgement, in col. 21, lines 24-40.

42. With respect to claim 40, Hughes et al. teach the computer storage medium of claim 39, wherein controlling access to the resource comprises disabling transmitting of the access requests, by the first processor, for a time period, in col. 29, lines 20-32.

43. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes et al. and Pitts et al. as applied to claims 1-3, 5-6, 12-21, and 27-40 above, and

further in view of "Enhancement of IEEE 802.11 Distributed Coordination Function with Exponential Increase Exponential Decrease Backoff Algorithm" by Nah-Oak Song, Byung-Jae Kwak, Jabin Song, and Leonord E. Miller, hereafter Song et al.

44. With respect to Claim 4, Hughes et al. and Pitts et al. teach all other limitations of the parent claims as discussed supra but fail to teach to exponentially decrease the delay as a result of a number of positive acknowledgements in response to access requests to the resource. Song et al. teaches an improvement to the exponential backoff model used by Hughes et al. Song et al. teaches, that in addition to exponentially increasing the backoff delay, to decrease the backoff delay exponentially in section III.

45. It would have been obvious to one of ordinary skill in the art, having the teachings of Pitts et al., Hughes et al., and Song et al. before him at the time the invention was made, to modify the recourse congestion apparatus of Pitts et al. and Hughes et al. with the improved resource congestion algorithm of Song et al. to achieve the performance benefits experienced by Song et al., such as increased throughput and decreased delay, with reference to the abstract.

46. With respect to Claim 7, Hughes et al. and Pitts et al. teach all other limitations of the parent claims as discussed supra but fail to teach to exponentially decrease the delay as a result of a number of positive acknowledgements in response to access requests to the resource. Song et al. teaches an improvement to the exponential backoff model used by Hughes et al. Song et al. teaches, that in addition to



exponentially increasing the backoff delay, to decrease the backoff delay exponentially in section III.

47. It would have been obvious to one of ordinary skill in the art, having the teachings of Pitts et al., Hughes et al., and Song et al. before him at the time the invention was made, to modify the recourse congestion system of Pitts et al. and Hughes et al. with the improved resource congestion algorithm of Song et al. to achieve the performance benefits experienced by Song et al., such as increased throughput and decreased delay, with reference to the abstract.

48. Claims 8-10 and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes et al. and Aikawa et al., US Patent 6898751.

49. With respect to Claim 8, Hughes et al. teach a processor comprising:

a functional unit to attempt to access a cache line in a cache memory coupled to the processor based on an access request, in figure 1 and col. 10, lines 1-2, wherein the functional unit is to retry attempts to access of the data based on other access of the data based on other access requests after receipt of a negative acknowledgement in response to the attempt to access the data, in col. 39, lines 20-32.

a congestion control logic to disable the functional unit from attempts to access the data for a time period after the congestion is detected in col. 39, lines 6-23.

Hughes et al. fail to teach that the congestion detection logic is based on an average number of negative acknowledgements received that exceed a threshold prior to access of the data. Aikawa et al. teaches using an average number of negative

acknowledgements in the abstract, where it is disclosed that the statistical parameter used can be an average, and fig. 3.

50. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Aikawa et al. et al. before him at the time the invention was made to combine the resource access system of Hughes et al. with the resource access system of Aikawa et al. in order to reduce congestion problems, as taught by Aikawa et al. in col.2, line 64 through col. 3, line 2.

51. With respect to claim 9, Aikawa et al. teach the processor of claim 8, wherein the average number of negative acknowledgements is within a window and wherein the congestion detection logic is to move the window over time of attempts, in col. 3, lines 5-14. Although the resource by Aikawa et al. is not a cache line accessed by a functional unit, Hughes et al. teach that the resource can be cache line as discussed in the parent claim.

52. With respect to claim 10, Aikawa et al. teach the processor of claim 8, wherein the congestion control logic is to exponentially increase the time period after the congestion detection logic is to detect congestion while access of other cache lines in the cache memory is congested, in col. 3, lines 16-20. Although the resource by Aikawa et al. is not a cache line in a cache memory, Hughes et al. teach that the resource can be a cache line in a cache memory as discussed in the parent claim.

53. With respect to claim 22, Hughes et al. teach a system comprising:

a cache memory to include a number of cache lines for storage of data, in col. 39, lines 6-9.

At least two processors, wherein a first processor of the at least two processors is to attempt to access the data in one of the number of cache lines based on access requests, in col. 39, lines 6-9.

Hughes et al. fails to teach that the congestion detection logic to detect congestion of access of a first cache line of the number of cache lines based on a ratio of a number of negative acknowledgments to a number of positive acknowledgments received in response to the access requests. Aikawa et al. teaches that the congestion logic can be any statistical parameter using negative and positive acknowledgments, in col. 6, lines 14-20, where the ratio would be the most simple statistical parameter using both types of acknowledgment.

54. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al. and Aikawa et al. before him at the time the invention was made to combine the resource access system of Hughes et al. with the resource access system of Aikawa et al. in order to reduce congestion problems, as taught by Aikawa et al. in col.2, line 64 through col. 3, line 2.

55. With respect to claim 23, Hughes et al. teach the system of claim 22, wherein a second processor of the at least two processors is associated with the cache memory and wherein the system further comprises a hub controller, the hub controller to receive the access requests from the first processor, the hub controller to forward the access requests to the second processor, wherein the second processor is to determine whether the one of the number of cache lines is accessible, in fig. 25, Processor 10a and Bus Bridge 202. The bus bridge acts as a hub controller in col. 43, lines 15-25.

56. With respect to claim 24, Hughes et al. teach the system of claim 23, wherein the second processor is to transmit a negative acknowledgement back to the first processor through the hub controller if the one of the number of cache lines is not accessible, the second processor to transmit a positive acknowledgement back to the first processor through the hub controller if the one of the number of cache lines is accessible, in col. 43, lines 15-25. Note that all requests are channeled through the bus bridge. Aikawa et al. teach sending a positive acknowledgement or a negative acknowledgement in col. 3, lines 12-23.

57. With respect to claim 25, Hughes et al. teach the system of claim 22, wherein the first processor further comprises a congestion control logic to disable, for a time period, the first processor to attempt to access the data if the congestion detection logic is to detect congestion of access of the first cache line, in col. 39, lines 20-32.

58. With respect to claim 26, Hughes et al. teach the system of claim 25, wherein the congestion control logic is to exponentially increase the time period after the congestion detection logic is to detect congestion while access to other cache lines in the cache memory, in the abstract.

59. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes et al. and Aikawa et al. as applied to claims 8-10 and 22-26 above, and further in view of Song et al.

60. With respect to claim 11, Hughes et al. and Aikawa et al. teach all other limitations of the parent claims as discussed supra, but fail to disclose that the congestion control logic is to exponentially decrease the time periods after the

congestion detection logic receives a number of positive acknowledgements in response to attempts to access other cache lines in the cache memory. Song et al. teaches an improvement to the exponential backoff model used by Hughes et al. and Aikawa et al. Song et al. teaches, that in addition to exponentially increasing the backoff delay, to decrease the backoff delay exponentially in section III.

61. It would have been obvious to one of ordinary skill in the art, having the teachings of Hughes et al., Aikawa et al., and Song et al. before him at the time the invention was made, to modify the recourse congestion system of Hughes et al. and Aikawa et al. with the improved resource congestion algorithm of Song et al. to achieve the performance benefits experienced by Song et al., such as increased throughput and decreased delay, with reference to the abstract.

### ***Response to Arguments***

62. Applicant's arguments filed on 2/2/2006 have been fully considered but they are not persuasive.

63. With respect to lack of motivation to combine references, see page 12 of Applicant's reply, in regard to claims 1-3, 5-6, 12-21, and 27-40, the Examiner did in fact identify a passage in Hughes that gave motivation to combine the resource access apparatus of Hughes with the resource access apparatus of Pitts. The Examiner pointed to the abstract of Hughes as it teaches that a reason to combine the two references is deadlock avoidance. The access system of Hughes teaches an exponential backoff after each negative acknowledgement. The access system of Pitts

teaches a fixed backoff after three consecutive negative acknowledgements. By combining the two references, you obtain all the benefits of having three immediate tries, but having a fixed backoff time as with Pitts, you may create deadlock. The Hughes reference resolves this deficiency by creating an exponential backoff. Since each reference seeks to solve a similar problem, a skilled artisan would have been motivated to combine the references at the time the invention was made.

64. With respect to the combination of the references not teaching all limitations, see pages 13-14, in regard to claims 1, 5, and 12, the Examiner has shown that Hughes and Pitts teach all limitations of claims 1, 5 and 12. Applicant asserts that merely a "report message" is sent and not a signal indicating a resource is congested. However, the two can be considered analogous, because a report message is sent over a signal line. See col. 21, lines 10-23 and fig. 2 of Pitts. Information sent to the Central Station 11 is sent over Phone Signal Lines 18.

65. With respect to claim 17, see the last paragraph of page 14, the Examiner has shown that the combination of Hughes and Pitts teach all limitations of claim 17. As discussed above and in the original Office Action, Pitts teaches sending a signal and zeroing the counter after a number of negative acknowledgments, specifically three. A common definition of congestion is "when the offered load of a data communication path exceeds the capacity." The reason Pitts teaches the delay is because of congestion over the signal line. See col. 23, lines 1-13.

66. With respect to Applicant's arguments on page 15 in regard to claims 27 and 34, the Examiner agrees that Pitts does not disclose or suggest that a first processor

receives an acknowledgement from a second processor associated with the memory. However, by applying the method of using acknowledgements as taught by Pitts, to the multiprocessor system of Hughes would allow the skilled artisan to achieve the invention of claims 27 and 34. It has been discussed supra that the skilled artisan at the time the invention was made would have been motivated to combine Hughes and Pitts.

67. With respect to Applicant's arguments on page 15 in regard to claims 31 and 38, the Examiner has shown above that Pitts does in fact teach congestion detection if a number of negative acknowledgments are received, specifically three.

68. With respect to Applicant's arguments on pages 15-16 in regard to claims 4 and 7, Applicant asserts that the Examiner did not identify a passage in song that suggests a reason for combining Hughes and Pitts with Song. The Examiner would like to point the Applicant to the first Office Action where the Examiner wrote "It would have been obvious to one of ordinary skill in the art, having the teachings of Pitts et al., Hughes et al., and Song et al. before him at the time the invention was made, to modify the recourse congestion apparatus of Pitts et al. and Hughes et al. with the improved resource congestion algorithm of Song et al. to achieve the performance benefits experienced by Song et al., such as increased throughput and decreased delay, with reference to the abstract." As can be seen, the Examiner clearly pointed to the Abstract of Song as a passage to suggest combining.

69. With respect to Applicant's arguments on page 16 in regard to claims 8-10 and 22-26: While the invention of Hughes does not disclose a polling system, both Hughes and Aikawa teach systems that aim to reduce congestion. The Examiner has shown

above that Hughes does in fact teach a congestion detection system. Therefore, combining Hughes with Aikawa, which teaches another way of reducing congestion would be obvious to one of ordinary skill in the art, as both seek to solve a similar problem.

70. With respect to Applicant's arguments on page 17, in regard to claims 22-26 and the combination of the reference not teaching all limitations, Applicant asserts that Aikawa does not disclose using ACKs at all. See col. 1, lines 14-23 where Aikawa mentions the use of ACKs in addition to NAKs. While the Aikawa reference does not anticipate all limitations of claim 22, it has been shown above that the combination of Aikawa with Hughes would allow the skilled artisan to have a good chance of success in achieving the invention of claim 22. While the Aikawa reference does relate to determining a polling interval, both Aikawa and Hughes relate to accessing a resource.

71. With respect to Applicant's arguments on pages 17-18 in regard to claim 11, the Examiner clearly pointed to the Abstract of Song as a passage which suggested modifying the system of and Aikawa with Song to achieve increased throughput and decreased delay, due to the improved algorithm of Song.

### ***Conclusion***

72. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

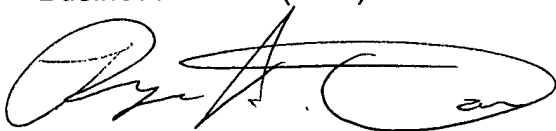


TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


73. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Dare whose telephone number is (571)272-4069. The examiner can normally be reached on Mon-Fri 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571)272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ryan Dare  
April 14, 2006



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